**3GPP TSG-WG SA2 Meeting #164 S2-2408805**

**Maastricht, Netherlands, August 19 - 23, 2024 (revision of s2-2408496, S2-2407196)**

**Source: China Mobile, China Unicom, Huawei, HiSilicon, Ericsson, Interdigital, Xiaomi, vivo**

**Title: TR 23.700-70 KI#2: Conclusion for Supporting PDU Set Info. Identification for E2E Encrypted XRM Traffic**

**Document for: Approval**

**Agenda Item: 19.3**

**Work Item / Release: FS\_XRM Ph2 / Rel-19**

*Abstract: This pCR proposes to conclude the KI#2.*

# 1 Discussion

This paper provides conclusion of KI#2: Support PDU Set information identification for end-to-end encrypted XRM traffic.

# 2 Proposal

It is proposed to include the below changes into TR 23.700-70.

*First Changes*

### 8. Conclusions

## 8.X Conclusions for Key Issue #2

The following principles are recommended to be included in the conclusions:

The normative R19 work will apply to UE to XRM server communication not to UE-UE XRM communication.

The XRM metadata shall be encrypted and integrity protected between the UPF and the AS.

The PSA UPF supporting the below functionality could be selected during the PDU session establishment with the consideration of the DNN and S-NSSAI.

Media over QUIC (MoQ) [9] and Proxy-UDP-in-HTTP/3[38]+QUIC-Aware Proxying[40] should be supported in normative work.

For MoQ, the PDU set information is accommodated via Metadata in MoQ. UPF supports the MoQ relay functionality and identifies the PDU Set information from the MoQ metadata. The detailed information include:

- AF provides the Protocol Description and the requirement for MoQ in order to support the encryption information identification from the PDUs in PDU Set following the AF session with QoS procedure. The request may include AS address.

- PCF determines PCC rules based on AF request, to instruct SMF/UPF to identify PDU Set information for MoQ traffic.

- SMF provides N4 rule to UPF to activate the MoQ relay functionality.

- UPF supports the MoQ relay functionality and identifies the PDU Set information from the MoQ metadata as defined in the Media-over-QUIC (MoQ) [9]. For DL, UPF includes the identified PDU Set information into GTP-U header as specified in Rel-18.

NOTE X: The FQDN of the MoQ traffic is subject to the SLA between the application server and operator.

NOTE X1: There is no 3GPP specification impact for UE. The application in UE uses MoQ protocol defined in [9] to obtain a MoQ relay address via DNS procedure e.g., EASDF based approach as described in TS 23.548, and establish MoQ connection with MoQ reply in UPF.

For Proxy-UDP-in-HTTP/3 + QUIC-Aware proxying, PDU set information is included in HTTP datagram via a new datagram mode or via packet transforms in QUIC-Aware proxying[40]. UPF supports the HTTP/3 Client functionality. The detailed information include:

- AF provides the Protocol Description for XRM metadata Information for encrypted traffic, and the AS address to enable an encapsulation protocol connection between the UPF and AS. This is done with using the AF session with QoS procedure, and meant to supportthe establishment of a UDP tunnel with the connect-UDP upgrade token.

- PCF generates a PCC rule including the indication of UDP tunnel establishment and AS address.

- SMF provides N4 rules to the UPF including the indication of UDP tunnel establishment and AS address.

- UPF supports the HTTP/3 Client functionality, which establishes a UDP tunnel to the AS (where HTTP/3 Proxy operates) with the connect-UDP upgrade token. For DL, UPF identifies the XRM metadata from the HTTP datagrams, and includes the PDU Set Information into GTP-U header as in Rel-18.

NOTE X3: Packets other than QUIC will be transmitted in tunnel mode.

1. XRM metadata may correspond to PDU set and Power Saving (as described in clause 5.37.8 of TS 23.501) related information defined in R18 but may also correspond to XRM metdata defined as output of other Key Issues of this TR such as KI#5.
2. the format of the XRM metatadata exchanged between the UPF and the AS will be defined by 3GPP .
3. The UPF and the AS negotiate in-band per QUIC-Aware proxying [40] whether QUIC-Aware proxying applies.
4. The specific packet transform will be specified by CT working groups (New packet transforms do not require IETF standardization, but the name of the packet transform must be registered with IANA)..

NOTE X4 : The XRM metadata in forward mode security will be defined by 3GPP.

1. In tunnel mode, the UDP payload packets are forwarded using Connect-UDP [38]. The XRM metadata is encoded into the UDP payload packets in a HTTP Datagram. Further details of the HTTP Datagram encoding is to be specified in stage 3

e2): Also in tunnel mode, for XRM metadata encoded into UDP-Option [21], the UDP Proxying payload packet contains UDP-Option in a HTTP Datagram. Further details of the XRM metadata encoding in UDP-Option is to be specified in stage 3. (New format does not require IETF standardization, but the name of the HTTP Datagram and the kind of the UDP-Option must be registered with IANA).

1. CID changes in forwarded mode are managed by UPF registering in the AS proxy the new CIDs observed in subsequent packets of the same 4-tuple.
2. For the support of forwarded mode , there is no HTTP/3 client on the UE in this release.

NOTE X5: The support of forwarded mode depends on IETF feedback, and then normative work on forwarded mode will start.

~~Further work by Ellen.~~

~~- For UDP-Option based RoQ, the PDU set information is accommodated via Metadata in UDP-Option. UPF supports the UDP-Option based RoQ functionality and identifies the PDU Set information from the metadata in UDP-Option. The detailed information include:~~

~~- AF provides the Protocol Description with information related to UDP-Option based RoQ traffic for PDU Set Information in order to support identification of PDU Sets for encrypted traffic by following the AF session with QoS procedure. The request includes QUIC session correlation ID (random number) and security keys for metadata encryption/integrity protection.~~

~~- PCF determines PCC rules based on AF request, to instruct SMF/UPF to identify PDU Set information for UDP option based RoQ traffic.~~

~~- SMF provides N4 rule to UPF to activate the UDP-Option based RoQ functionality.~~

~~- UPF supports the UDP-Option based RoQ functionality and identifies the PDU Set information from the metadata in UDP-Option. For DL, UPF includes the identified PDU Set information into GTP-U header as specified in Rel-18.~~

~~- UE: no UE impacts on media transport over N6.~~

*End of Changes*